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# INTERNATIONAL COOPERATION ON CLIMATE CHANGE MONITORING VIA SATELLITES

**Abstract**

In order to understand and effectively predict, prevent, or adapt to changes caused by global climate change, it is necessary to have sufficient data regarding the environment, and much of this data can be collected by satellites. Many nations already operate satellites focused on collecting climate change data. However, if countries were to coordinate in the planning of satellite constellations and then share the data collected by these satellites, more of the data could be collected and the data could be analyzed more quickly and effectively.

There are a number of international organizations that have already attempted to organize this type of cooperation. While these groups have made steps towards greater international cooperation, they have not accomplished the goal of creating a global satellite data-sharing system. There are currently significant gaps and overlaps in the data being collected by existing and planned future satellites. International coordination in satellite constellation planning is minimal, and satellite data sharing policies vary widely by country and by satellite.

This paper provides an overview of the historic development of climate change monitoring via satellite, including the genesis of national programs for satellite based climate change monitoring as well as the creation and operation of international organizations in this arena, such as the Global Climate Observing Program (GCOS), the Global Earth Observation System of Systems (GEOSS), and the World Climate Research Program (GCRP).

It then develops a theoretical argument for each of six potential impediments to greater satellite data collection and sharing: economic, trust, security, commercial, organizational, and normative challenges. For example, game theory is used to examine both the economic and trust issues by modeling economic concerns as an n-player prisoner's dilemma. The situation suggests that issues of free-riding may be a significant concern in developing an international data-sharing regime. Another game, the stag hunt, allows the examination of likely effects of problems of trust among potential international partners. Partners may not be certain that if they build a satellite and share data, others will build the complementary satellites and share their respective data. Organization theory is used to examine the idea that organizational inertia may be a major impediment to progress in this area. Finally, the literature on norm emergence is examined to understand how the potential for future cooperation may build on an examination of how international norms are developed and how they cascade.